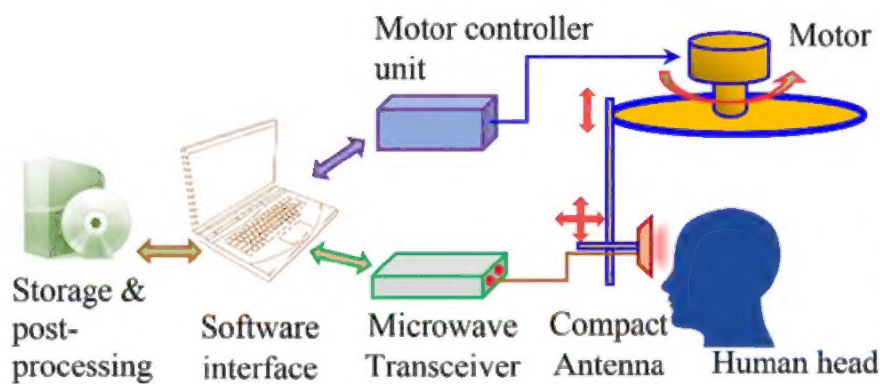
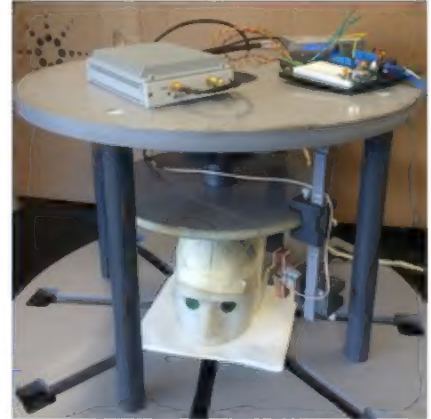


Microwave imaging & microwave camera



(a)



(b)

brain imaging system

A microwave camera uses millimeter waves to detect hidden objects by illuminating them and measuring the reflected waves, which are then converted into digital images to show internal structures or material properties. Unlike conventional cameras, it penetrates surfaces that are opaque to visible light, such as drywall or plywood, making it useful for security, quality control, and locating survivors in disaster situations by detecting anomalies that differ from their surrounding environment.

- How it works:

1. Transmission:

The system emits electromagnetic waves, specifically millimeter waves, towards an object or scene.

2. Reflection & Detection:

These waves are reflected by objects within the scene, especially when they have different electromagnetic properties compared to their surroundings.

3. Signal Collection:

A receiver antenna, or an array of antennas, collects these reflected waves.

4. Image Formation:

Sophisticated algorithms and software process the received signals to create a digital image. This imaging process can map out the interior of objects or identify specific features based on how they interact with the microwaves.

- Microwave imaging:

Microwave imaging has diverse applications, including security screening for concealed weapons, medical diagnostics for cancer and brain

conditions, non-destructive testing for structural health and packaged goods, and through-the-wall imaging for surveillance. The technology uses harmless electromagnetic waves to create images of internal structures, detecting differences in tissue or material properties without damaging the subject.

- Key Features & Benefits:

*** Penetration:**

Microwaves can pass through many materials that block visible light, allowing the camera to see through walls and other barriers.

*** Material Property Detection:**

By analyzing the reflected signals, microwave imaging can identify the dielectric properties of an object, revealing information about its composition.

- Applications:

*** Security & Surveillance:**

Inspecting packages for hidden items.

*** Quality Assurance:**

Checking for defects in materials or finished products.

*** Biomedical Imaging:**

Potentially imaging the human body for medical diagnosis.

*** Disaster Response:**

Locating people trapped under rubble or in hazardous conditions.

*** Non-Destructive Testing:**

Examining infrastructure for internal faults without causing damage.

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<https://archive.org/details/@wazefapress>

Resources:

<https://www.baslerweb.com/en/innovation/microwave-imaging/>

<https://www.nature.com/articles/srep14709>

<https://pmc.ncbi.nlm.nih.gov/articles/PMC4592950/>

https://en.m.wikipedia.org/wiki/Microwave_imaging

<https://pmc.ncbi.nlm.nih.gov/articles/PMC8221233/>